
Delta Challenges Workshop Charge

Date TBD

Workshop Purpose

The purpose of this effort is to have an independent panel (Panel) of science experts summarize the risks and challenges facing the management of the Bay-Delta system in a clear, concise, easy to understand document. The managers, regulators, and scientists deeply involved in helping to achieve the coequal goals of the Delta Plan recognize the great inherent vulnerability and complexity of the natural and human-made systems and their interaction in the Delta. They also recognize the enormous challenge that vulnerability and complexity present to effective management of water delivery, ecosystem health, and the unique agricultural, cultural, and recreational characteristics of the Delta. These threats and complexities are not as well known to policy and decision-makers less involved in California water issues. The Panel will be provided key reports, scientific papers, and presentations to create a concise written report summarizing our current knowledge for use by policy-makers and the public.

Background

A multitude of stressors threaten our ability to achieve the Delta Plan's coequal goals of providing a more reliable water supply for California and protecting, restoring and enhancing the Delta ecosystem. There are numerous publications, reports and articles that describe the multiple stressors influencing the Delta and the severe risks facing the contemporary Delta, but this information is spread across diverse journal articles, reports and reviews. Many stressors produce non-linear effects on the system, and the system does not respond to each stressor individually. In addition, how the system will change in time in response to both current and future (new) stressors is uncertain.

The complexity of the system and the stressors themselves has historically been an impediment to creating and implementing policy in the Delta. Policy and decision-makers need to plan management of the Delta in the context of multiple complex stressors, but to do so requires an understanding of the many stressors present in the Delta and their effects, interactions, and implications for management. While great strides have been made in many areas of scientific research over the past several decades, policy needs are still not being fully met because translating, synthesizing and distilling information for use by policy-makers is challenging. The purpose of this workshop is to develop a single, concise, easy to understand summary of these challenges for use by policy-makers and the general public.

Charge to the Panel

The Panel is charged with reviewing and assessing the provided written materials and oral presentations in order to develop a scientifically based description of threats to the coequal goals of water supply reliability and ecosystem health. This summary must capture the complexity and interrelationships of these threats to explain why it is so difficult to understand and resolve the issues. The Panel will evaluate and synthesize the best available scientific information and prepare a report in which they will describe concisely why the Delta is such a complex system, what is known about the major stressors, the stressor interactions and why so much uncertainty exists despite the considerable knowledge that has been generated over the past four decades. No new analyses are anticipated; rather, the goal is to produce a concise, easy to understand summary of our current knowledge for use by policy-makers and the public. The Panel summary report should include:

Executive Summary

The Delta

- Physical description
- The ecosystem
- A changed landscape – what does this mean to water supply and ecosystem?
- The economic and social stakes associated with the Delta

What are the principal stressors and threats to the Delta?

In general, how do these stressors interact?

Why is the Delta so complex and changing so rapidly?

Materials

Panelists will review the following documents prior to attending the workshop. All materials will be provided in electronic format.

Delta Independent Science Board (ISB)

Delta ISB. 2011. **Final Memo to Phil Isenberg from the Delta ISB: Addressing Multiple Stressors and Multiple Goals in the Delta Plan.**

(http://deltacouncil.ca.gov/sites/default/files/documents/files/d-isb_20110126_stressor_short_memo_final_1.pdf)

National Research Council (NRC)

NRC. 2012. **Sustainable Water and Environmental Management in the California Bay-Delta.**

(<http://www.nap.edu/catalog/13394/sustainable-water-and-environmental-management-in-the-california-baydelta>)

NRC. 2011. **A Review of the Use of Science and Adaptive Management in California's Draft Bay**

Delta Conservation Plan.

(<http://www.nap.edu/catalog/13148/a-review-of-the-use-of-science-and-adaptive-management-in-californias-draft-bay-delta-conservation-plan>)

NRC. 2010. A Scientific Assessment of Alternatives for Reducing Water Management Effects on Threatened and Endangered Fishes in California's Bay Delta.

(<http://www.nap.edu/catalog/12881/a-scientific-assessment-of-alternatives-for-reducing-water-management-effects-on-threatened-and-endangered-fishes-in-californias-bay-delta>)

Public Policy Institute of California

Hanak, E, JR Lund, J Durand, WE Fleenor, B Gray, J Medellin-Azuara, JF Mount, PB Moyle, C Phillips, and B Thompson. 2013. **Stress Relief: Prescriptions for a Healthier Delta Ecosystem.** San Francisco: Public Policy Institute of California.

(http://www.ppic.org/content/pubs/report/R_413EH2R.pdf)

Mount, JF, WA Bennett, J Durand, WE Fleenor, E Hanak, JR Lund, and PB Moyle. 2012. **Aquatic Ecosystem Stressors in the Sacramento-San Joaquin Delta.** San Francisco: Public Policy Institute of California.

(http://www.ppic.org/content/pubs/report/R_612JMR.pdf)

Lund, JR, E Hanak, WE Fleenor, WA Bennett, RE Howitt, JF Mount, and PB Moyle. 2010. **Comparing Futures for the Sacramento–San Joaquin Delta.** San Francisco: Public Policy Institute of California.

(http://www.ppic.org/content/pubs/report/R_708EHR.pdf)

Lund, JR, E Hanak, WE Fleenor, RE Howitt, JF Mount, and PB Moyle. 2007. **Envisioning Futures for the Sacramento-San Joaquin Delta.** San Francisco: Public Policy Institute of California.

(http://www.ppic.org/content/pubs/report/R_207JLR.pdf)

General Background

Reed, D, JT Hollibaugh, J Korman, E Peebles, K Rose, P Smith, and P Montagna. 2014. **Delta Outflows and Related Stressors.** Panel Report prepared following the Workshop on Delta Outflows and Related Stressors, held February 10-11, 2014.

(<http://deltacouncil.ca.gov/sites/default/files/documents/files/Delta-Outflows-Report-Final-2014-05-05.pdf>)

Monismith, S, M Fabrizio, M Healey, J Nestler, K Rose, and J Van Sickle. 2014. **Interior Delta Flows and Related Stressors.** Panel Report prepared following the Workshop on Interior Delta Flows and Related Stressors, held April 16-17, 2014.

(<http://deltacouncil.ca.gov/sites/default/files/documents/files/Int-Flows-and-Related-Stressors-Report.pdf>)

IEP (Interagency Ecological Program). 2013. **Management, Analysis, and Synthesis Team report** (final version to be released soon).

(http://www.water.ca.gov/iep/docs/mast_draft_7-21-13.pdf)

Grossman, GD, T Essington, B Johnson, J Miller, NE Monsen, and TN Pearsons. 2013. **Effects of fish predation on salmonids in the Sacramento River-San Joaquin Delta and associated ecosystems.**

Panel Report prepared following the State of the Science Workshop on Fish Predation on Central Valley Salmonids in the Bay-Delta Watershed, held July 22-23, 2013.

(http://deltacouncil.ca.gov/sites/default/files/documents/files/Fish_Predation_Final_Report_9_30_13.pdf)

SWRCB (State Water Resources Control Board). 2010. **Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem.** California State Water Resources Control Board, California Environmental Protection Agency.

(http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf)

Healey, MC, MD Dettinger, and RB Norgaard, eds. 2008. **The State of Bay-Delta Science, 2008.** Sacramento: CALFED Science Program.

(http://www.science.calwater.ca.gov/pdf/publications/sbds/sbds_final_update_122408.pdf)

Peer-reviewed Literature

Cloern, JE, and AD Jassby. 2012. **Drivers of change in estuarine-coastal ecosystems: discoveries from four decades of study in San Francisco Bay.** American Geophysical Union 50(RG4001): 1-33.
(<http://onlinelibrary.wiley.com/doi/10.1029/2012RG000397/pdf>)

Cloern, JE, N Knowles, LR Brown, D Cayan, MD Dettinger, TL Morgan, DH Schoellhamer, MT Stacey, M van der Wegen, RW Wagner, and AD Jassby. 2011. **Projected Evolution of California's San Francisco Bay-Delta-River System in a Century of Climate Change.** PLoS ONE 6(9): e24465.
(<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0024465>)

Winder, M, AD Jassby, R MacNally. 2011. **Synergies between climate anomalies and hydrological modifications facilitate estuarine biotic invasions.** Ecology Letters 14(8): 749-757.
(<http://onlinelibrary.wiley.com/doi/10.1111/j.1461-0248.2011.01635.x>)

Monsen, NE, JE Cloern, and JR Burau. 2007. **Effects of flow diversion on water and habitat quality: Examples from California's highly manipulated Sacramento-San Joaquin Delta.** San Francisco Estuary and Watershed Science 5: Article 2.
(http://sfbay.wr.usgs.gov/publications/pdf/monsens_2007_DeltaFlowDiversionEffects.pdf)

Potential List of Panelists

Core comprised of previous Lead Scientists

- Sam Luoma (Contaminants)
- Johnnie Moore (Geology/seismic/levees)
- Mike Healey (Salmon/Smelt/Adaptive Management)
- Cliff Dahm (Nutrients/Adaptive Management)

Others from:

- Jim Anderson (Salmon, Smelt)
- Jim Cloern (Ecology, Food webs, Regime Shifts)
- Peter Gleick (Water Footprints/Population Pressures)
- Judy Meyer (Ecology)
- Anke Mueller-Solger (former IEP Lead Scientist, Food webs, Nutrients)
- Richard Norgaard (Social Sciences/Economics)
- Denise Reed (Wetlands, Adaptive Management)
- Kenny Rose (Salmon, Smelt, Modeling)
- Mark Stacey (Hydrodynamics/Sediment Transport)
- Jim Tebow (Social Sciences/Economics)
- David Wegner (Water Policy)
- Joy Zedler (Ecology)

Plus technical writer – Darcy Austin?

Potential List of Presenters

- Jon Burau – hydrodynamics and sediments
- Les Grober – SWRCB perspective
- Robin Grossinger – Historical ecology and ecosystem functions
- Richard Howitt – Economic consequences
- Ellen Hanak – PPIC summary
- David Mraz – Levees
- Fish Panel – Peter Moyle, Mike Chotkowski, Maria Rea, Ted Sommer
- Water Operations Panel – Walter Bourez, John Leahigh, Ron Mulligan